Heating ◆ Piping and Air Conditioning

January-December, 1935—Vol. 7, Nos. 1-12

As will be noted, these abstracts are classified under general heads. In looking for information on a specific subject, it will be well to look through the abstracts under the most suitable heading, and also to look through those under the other headings. For example, some of the heating articles also contain information on air conditioning, and vice versa, *as the grouping has been made on the basis of the subject most prominently covered in the article.*

The index to the Journal Section *of the* American Society of Heating and Ventilating Engineers *is separate* (*see page* 618).

This index does not include Equipment Developments; Book Reviews; Booklets, Reports, and Papers; Recent Trade Literature; and Conventions and Expositions, departments appearing regularly each month. The Editor's Page in each issue includes items of news, comments on current events, etc.

Air Conditioning

Air Conditioning Aids Manufacture of Ale, by A. B. Wason.
Vol. 7. No. 4. April, 1935. *p.* 193.
Dawes brewery, Montreal, Canada, modernized by central station cooling and air condition system for fermentation room; advantages of controlled temperature and humidity; photos of fermentation room, dehumidifier, and fans.

Air Conditioning for Motor Buses Announced; System Described.
Vol. 7. No. 11. November, 1935. *p.* 537.
Method of air conditioning buses developed by Ralph F. Peo and E. P. Heckel described; equipment; load for typical bus; diagrammatic sketch of equipment; view of test car.

Air Conditioning Frees Rotogravure Plant from Weather Hazards, by H. E. Jacobsen.
Vol. 7. No. 9. September, 1935. *p.* 423.
Air conditioning at Alco Gravure, Inc., Chicago, Ill.; temperatures and humidities for various departments; six condensing units for flexibility; air cycle and distribution; pneumatic temperature and humidity control system.

Air Conditioning—from the Building Owner's Viewpoint, by Paul E. Holcombe.
Vol. 7. No. 3. March, 1935. *p.* 141.
Reasons for confusion regarding air conditioning on part of prospective purchasers; how such confusion may be clarified; defining air conditioning and partial air conditioning.

Air Conditioning Fundamentals—Total Heat-Entropy Charts for Refrigerants, by Louis A. Harding.
Vol. 7. No. 9. September, 1935. *p.* 429.
Theory of compression refrigeration cycle; general energy equation; definitions of terms; diagram of Rankine cycle; adiabatic expansion or compression; throttling process; refrigerating effect and weight of refrigerant to circulate per minute; compressor power input; compressor displacement; heat removed by condenser and weight of cooling water required; total heat—entropy diagrams for ammonia, carbon dioxide, sulphur dioxide, methyl chloride, and "Freon"; examples of use.

Air Conditioning in Louisville.
Vol. 7. No. 4. April, 1935. *p.* 180.
Air conditioning installations in Louisville, Ky., hp connected, kw connected, kw-hr per season, kw additional billing demand.

Air Conditioning in St. Louis.
Vol. 7. No. 3. March, 1935. *p.* 136.
Number of air conditioning installations and kilowatt load they represent prior to 1933, during 1933, and during 1934 for St. Louis, Mo.; types of buildings air conditioned.

Air Conditioning Installations in Two More Cities Reported.
Vol. 7. No. 2. February, 1935. *p.* 96.
Number of installations, tonnage, and horsepower for air conditioning installations in Newark, N. J., and Dallas, Texas, for 1934 compared with previous years.

Air Conditioning Maintains Quality of Fruits and Vegetables, by Clarence E. Baker.
Vol. 7. No. 8. August, 1935. *p.* 369.
Cooling fruits and vegetables; cooling apples in packages; research work summarized; advantages of precooling; preheating for cold weather protection; dry ice refrigerator cars; carbon dioxide gas air conditioning; other gases for air conditioning; photos and description of installation at La Verne (Calif.) Lemon Growers' Association.

Air Conditioning Makes a "Strike," by J. M. Chambliss.
Vol. 7. No. 10. October, 1935. *p.* 468.
Air conditioning system installed in bowling alley; business increases.

Air Conditioning Modernizes Filene's, by Richard Brunel with Francis A. Westbrook.
Vol. 7. No. 9. September, 1935. *p.* 434.
Air conditioning installation for Wm. Filene's Sons Co., Boston, Mass., five centrifugal compressors have 1200 ton capacity; layout of system; cross-section of building showing air conditioning equipment; photos of equipment.

Air Conditioning Modernizes Library; Promotes Efficiency, Protects Books, by Ford J. Cumming.
Vol. 7, No. 12. December, 1935. *p.* 565.
Year 'round air conditioning system for James J. Hill Reference Library, St. Paul, Minn.; the building; outdoor air treating unit; recirculating cooling and dehumidifying units; 52 F water from deep well; ducts and grilles; air circulation; temperature and humidity control; cold water circulation; heating and humidifying; photos of equipment.

Air Conditioning Modernizes Office Building, by S. L. Rolland.
Vol. 7. No. 11. November, 1935. *p.* 524.
System installed in main office building of Oklahoma Gas and Electric Co., Oklahoma City; two 28 ton ammonia compressors; chilled water circulated to units; conditioning main floor; three zones for fifth floor; control balances indoor with outdoor conditions; conditions maintained; design conditions; comparison of theoretical and actual conditions maintained on typical day; comfort chart; photos of equipment and building; advantages of air conditioned offices.

Air Conditioning New KDKA Studios, by H. W. Reding.
Vol. 7. No. 4. April, 1935. *p.* 196.
Air conditioning new studios for radio station in Grant building, Pittsburgh, Pa.; air cycle; details of design; control; floor plan; photos of equipment.

Air Conditioning Problems Solved by Spray Water-Air Chart, by William Goodman.
Vol. 7. No. 5. May, 1935. *p.* 233.
Spray water—air chart simplifies solution of problems involving use of spray water type coolers in industrial and comfort air conditioning; use and examples involving single stage washers; correction of theoretical results; total heat of air at various wet bulb temperatures. (See also article published in August, 1935, issue, p. 382.)

Air Conditioning Protects Aeronautical Instruments, by A. J. Rummel.
Vol. 7. No. 6. June, 1935. *p.* 276.
Description of air conditioning system for aeronautical repair and test room at San Antonio Air Depot, Duncan Field, Texas; reasons for air conditioning; equipment; control; plan and elevation.

Air Conditioning Rescues Industry from the Weather, by Bayard P. Fonda.
Vol. 7. No. 1. January, 1935. *p.* 12.
Year-around control of humidity in Waverly Press, Baltimore, Md.; need for air conditioning; difficulty caused by variations in thickness of wood blocks on which printing plates are mounted; instrument devised to study effect of varying air temperatures and humidities on the blocks; graph of results of investigation; adsorption type of dehumidifier installed, using silica gel reactivated by gas firing; schematic diagram of system; construction of dehumidifier; photos of dehumidifier; control; gas and electrical power required; results.

Air Conditioning with Ice, by Clifford F. Holske.
Vol. 7. No. 8. August, 1935. *p.* 387.
Consumption of ice and load factor for several installations; applications of ice in air conditioning work.

Apartment Building Air Conditioning in Argentina, by Rudolf Kuhlmann.
Vol. 7. No. 4. April, 1935. *p.* 187.
Air Conditioning system for Kavanagh building, Buenos Aires; 33 story apartment building; 400 ton centrifugal compressor; air distribution scheme; other types of systems for apartment buildings; operating costs; advantages.

Chicago Air Conditioning Standards Ready; Results Emphasized.
Vol. 7. No. 11. November, 1935. *p.* 539.
Standards prepared by committee; emphasize results; how committee was formed; the standards. (See also "Progress in A. C. Standardization," August, 1935, issue, p. 377.)

Chilled Water Pump Installation for Steam Jet Jobs Requires Care, by J. J. Hayes.
Vol. 7. No. 1. January, 1935. *p.* 11.
Type of pump and method of installation required to avoid trouble; how one job was corrected.

Choosing the Right Air Conditioning System, by A. Warren Canney.
Vol. 7. No. 2. February, 1935. *p.* 85.
(Part 3—Basic Differences Between Central Station and Unit System); choice of air conditioning method; fundamentals

involved in a choice; the process of air conditioning sketches and explanation of the different types of systems and apparatus.

Choosing the Right Air Conditioning System, by A. Warren Canney.
Vol. 7. No. 4. April, 1935. p. 202.
Fundamental considerations; check list for choice of central station or unit system; relation of air conditioning system to heating; extension of summer systems to year 'round systems, with table to aid decision; importance of ducts to air distribution.

Choosing the Right Air Conditioning System, by A. Warren Canney.
Vol. 7. No. 6. June, 1935. p. 287.
Fundamental considerations; direct expansion, cold water coils, and sprays; relation between latent and total heat; coordination of control; outdoor air volume; variations of conventional air conditioning methods.

Choosing the Right Air Conditioning System, by A. Warren Canney.
Vol. 7. No. 8. August, 1935. p. 375.
Central station system; considerations in choosing a central plant; importance of control; what the purchaser should look for; diagrams of two types of central station plants.

Choosing the Right Air Conditioning System, by A. Warren Canney.
Vol. 7. No. 10. October, 1935. p. 469.
(Part 7—Use of Units); when to use units; location of equipment; direct expansion units and control; table of latent to total heat ratios for different types of spaces, and necessary supply temperature of a saturating conditioner; use of table; example of design using direct expansion coils.

Choosing the Right Air Conditioning System, by A. Warren Canney.
Vol. 7, No. 12. December, 1935. p. 577.
Conclusion of series; summary of technical factors influencing the design of the right system to meet requirements; temperature and humidity guarantees do not insure complete satisfaction; outdoor air volumes; control; buyer's emphasis is on comfort.

Comfort Zone Is Not Always the Health Zone, by Lloyd Arnold.
Vol. 7. No. 10. October, 1935. p. 489.
Skin's function in control of body temperature; harmful effects of sudden temperature changes; medical profession's viewpoint of air conditioning; need of further research.

Commercial Air Conditioning Jobs Predominate, Report Shows.
Vol. 7. No. 11. November, 1935. p. 518.
(Review of air conditioning report issued by Electric Bond & Share Co.); types of air conditioning jobs served by operating companies; what utility company air conditioning statistics cover.

Conservation of Water Required for Air Conditioning, by Rudolf Kuhlmann.
Vol. 7. No. 7. July, 1935. p. 333.
Air conditioning jobs in Rio de Janeiro and Sao Paulo, briefly described; conserving condensing water; cooling tower; spray pond; deep well, other methods; photos of equipment.

Consulting Engineer Tells How to Improve Theater Air Conditioning, by D. D. Kimball.
Vol. 7. No. 1. January, 1935. p. 14.
(Continued from Part 1, published in December, 1934, issue); introduction of conditioned air at ceiling; types of systems in movie theaters; air distribution; ventilation of accessory spaces; cooling installations; dehumidifiers; air filters; air heaters; duct systems; duct insulation; refrigerating machinery; use of well water for economy.

Control of Squirrel Cage Motors for Heating and Air Conditioning Service, by N. D. Buehling.
Vol. 7. No. 10. October, 1935. p. 480.
Use of automatic motor control in heating and air conditioning; starting squirrel cage motors; multi-speed motors and control; applications of automatic starting equipment; internal views of various types of starters; connection diagrams.

Crane Operators Cooled.
Vol. 7. No. 10. October, 1935. p. 488.
Cooling units installed in cabs of cranes at A. M. Byers plant; cabs insulated.

Diffusion of Conditioned Air, by Samuel R. Lewis.
Vol. 7. No. 3. March, 1935. p. 138.
Importance of proper introduction of conditioned air; use of same units for heating and cooling; providing ventilation with unit air conditioning apparatus; introducing conditioned air to a room; sketches of proper and improper arrangement and location of air inlets and outlets, showing air circulation.

Directory of Industrial and Commercial Air Conditioning Equipment Section.
Vol. 7. No. 1. January, 1935. p. 57.
Products classified; trade names; manufacturers' addresses.

Duct Design, Selection of Fan and Motor for Fume Exhaust Systems, by B. F. Postman.
Vol. 7, No. 12. December, 1935. p. 572.
Design of fume exhaust system described in detail; sizing the ducts; selection of the fan and motor; fan performance curves; checking up on operation.

Enamel Shop Prevents Contamination of Air, Fouling of Ducts, Reclaims Enamel.
Vol. 7. No. 2. February, 1935. p. 95.
Installation of water wash spray booths in enamel shop of Edison General Electric Appliance Co., Chicago, Ill.; reasons for installation; preventing contamination of plant air; value of enamel reclaimed; view of exhaust system for dusting tables.

Estimating Approximate Cost and Capacity of Air Conditioning.
Vol. 7. No. 9. September, 1935. p. 433.
(Abstract from paper presented by E. B. Murray); estimating tonnage, initial cost and operating cost for air conditioning for various purposes; cu ft per ton for various types of spaces.

Field's "Merchandise Express" Brings Goods, Comfort to Buyers.
Vol. 7. No. 9. September, 1935. p. 444.
Brief description of Marshall Field & Co.'s "Merchandise Express"; ten cars air conditioned; photo of power car.

Flow of Air Through a Fan.
Vol. 7. No. 5. May, 1935. p. 236.
Application of stroboscope to study of flow of air through a fan; set-up of apparatus; photo of moving fan and vortex of smoke at blade tip.

Get Conditioned Air to the Occupant!, by D. D. Kimball.
Vol. 7. No. 2. February, 1935. p. 91.
Air distribution in theaters and auditoriums; importance of getting the air to the occupant without drafts; arrangement of inlets and outlets; spring and fall operation of theater air conditioning plants; accessibility of equipment; amount of cooling required in theaters.

Guests Like Comfort of Cooled Rooms, Detroit Statler Finds.
Vol. 7. No. 1. January, 1935. p. 4.
Survey of guest reactions to air conditioning in Hotel Statler, Detroit.

Heat Balance Analysis for Air Conditioning, by Louis A. Harding.
Vol. 7. No. 11. November, 1935. p. 531.
Explanation of heat balance method of analysis and its advantages; nomenclature; an example; table of properties of refrigerants; forms for recording comfort cooling computations.

Heating and Air Conditioning the Newest Stream-Liner.
Vol. 7. No. 3. March, 1935. p. 131.
Brief description of heating and air conditioning systems for stainless steel, diesel train of the Boston and Maine and Maine Central railroads, the "Flying Yankee"; activity in railway air conditioning.

H. P. & A. C. Inspection Trips (San Francisco's 5,000 Seat Fox Theater).
Vol. 7. No. 3. March, 1935. p. 143.
Brief description and illustrations of the air conditioning and heating equipment of this theater; operating problems; box office value of air conditioning.

Metering Air Conditioning Output, by W. H. Junker.
Vol. 7. No. 10. October, 1935. p. 478.
Metering air conditioning service for billing tenants; diagram and photo of instruments, showing hook-up used; computing total tonnage and billing.

Modernize Buildings for Health and Comfort as Well as Economy, by John Howatt.
Vol. 7. No. 2. February, 1935. p. 100.
Importance of modernizing for comfort of occupants as well as economy in heating; summer comfort should be provided in modern buildings.

Modernize "Main Street."
Vol. 7. No. 5. May, 1935. p. 237.
$50,000 amendment to National Housing Act aimed to promote modernization of industrial and business property; modernizing with air conditioning; references to modernization projects; advantages of air conditioning an office building.

Modernizing Buildings for Profit.
Vol. 7. No. 7. July, 1935. p. 339.
$50,000 amendment to National Housing Act; examples of modernizing heating and air conditioning systems; advantages of air conditioning restaurants, offices, hotels, etc.; description of air conditioning system for office of Cupples Co., St. Louis, Mo.; photo of office showing ducts.

Modernizing with Air Conditioning, by Terry Mitchell.
Vol. 7, No. 12. December, 1935. p. 581.
Direct expansion "Freon" air conditioning system for National Reserve Life Insurance Co. building, Topeka, Kan.; three compressors offer eight capacity groupings; suction and discharge piping; condenser and receiver located under cooling tower on roof, compressors in basement; control is by zones; the duct layout and the conditioning units; photos of building and the compressors.

Noise in Ventilating Systems.
Vol. 7. No. 2. February, 1935. p. 79 (back section).
(Answer by D. D. Kimball to reader's question); noise caused by air conditioning and ventilating systems in theater installations; methods used to prevent noise; cleaning of ducts.

Operation and Maintenance of Plant Air Conditioning System to Avoid Service Interruption, by W. C. Giles.
Vol. 7. No. 3. March, 1935. p. 127.
Importance of maintenance of industrial air conditioning systems; dirt in circulating water; replacing spray heads and headers; corrosion of humidifiers; maintenance of fans, condensers, and other equipment; checking maintained conditions; log sheet for preserving records of conditions maintained.

Plant Engineer Licks Problem of Removing Moisture-Laden Air, by L. Duckman.
Vol. 7. No. 3. March, 1935. p. 137.
Arrangement at Oscar Heineman Corp., Chicago, Ill., for removing moisture-laden air and fog from room containing 140 open vats; plan of arrangement; location of exhaust outlets.

Railway Air Conditioning Makes Rapid Strides.
Vol. 7. No. 1. January, 1935. p. 26.
New air conditioned coaches of The New Haven Railroad; features; exterior view and close-up of air conditioning equipment.

Selection and Maintenance of Industrial Air Conditioning Systems, by William A. Hanley.
Vol. 7. No. 1. January, 1935. p. 22.
Shell, eliminators and fan; washer insulation; piping; pumps; control; maintenance suggestions.

Selection Chart for Cooling Coils, by Louis A. Harding.
Vol. 7. No. 8. August, 1935. p. 386.
Chart for selection of direct expansion cooling coils and directions for use. (See also article published in July, 1935, issue, p. 317.)

South African Gold Mines Adopt Air Conditioning.
Vol. 7. No. 9. September, 1935. *p.* 444.
Brief description of air conditioning sytems for South African gold mines; advantages of air conditioning mines.

Sprinkler Heads Smother Range Hood Duct Fires, by H. G. Schaefer.
Vol. 7. No. 4. April, 1935. *p.* 188.
Use of sprinkler heads for putting out kitchen range hood duct fires; valve sealed open. (Also see comment by John G. Eadie, May, 1935, issue, p. 88, back section.)

Temperature and Humidity Requirements for Air Conditioning in Philippines.
Vol. 7. No. 2. February, 1935. *p.* 102.
Requirements for air conditioning in the Philippine Islands; requirements for office buildings.

"Thermohygrics"—a Suggestion, by Edgar S. Miller.
Vol. 7. No. 5. May, 1935. *p.* 235.
"Thermohygric engineer" suggested as better defining heating, ventilating, and air conditioning engineers.

30-Year-Old Museum Modernized, by Arthur C. Babcock.
Vol. 7. No. 6. June, 1935. *p.* 269.
Alteration and reconstruction of Brooklyn Institute of Arts and Sciences, New York; cost; the old heating and ventilating system; design of new system and construction details; design data; ducts, grilles, and diffusers; section through lighting trough showing ducts; plan of alterations; photos of exterior, indirect lighting cove and air baffles, aluminum grills and diffusers.

Total Installed Air Conditioning Tonnage Increases 21% in 1934.
Vol. 7. No. 1. January, 1935. *p.* 1.
Figures for 13 cities show total installed tons of refrigeration for air conditioning increased during 1934 from 65,000 to 78,500 tons; summary of air conditioning installations 1934 and prior to 1934 in Baltimore, Boston, Birmingham, Chicago, Cincinnati, Kansas City, Philadelphia, Pittsburgh, Northern California, Nashville, Cleveland, Atlanta (and suburbs), Omaha, New Orleans, Detroit, Michigan (except Detroit), New York City (Manhattan only), Oklahoma and Arkansas; types of installations and systems, number of jobs, tonnage and hp. (Tables and graph.)

Two Stage Air Washer Problems Solved by Chart, by William Goodman.
Vol. 7. No. 8. August, 1935. *p.* 382.
(See also article published in May, 1935, issue, p. 233); problems involving two stage counterflow coolers; two stage split air washers; effect of varying proportions of water to each stage.

U. S. Equipment Air Conditions Montevideo Banking Building, by Rudolf Kuhlmann.
Vol. 7. No. 11. November, 1935. *p.* 533.
Brief description of air conditioning and heating equipment at Banco de la Republica Oriental del Uruguay; no radiators in building.

Valuable Byproducts from Waste—Piping and Drying Equipment for Reclaiming Whiskey Still Waste, by Warren Viessman.
Vol. 7. No. 7. July, 1935. *p.* 327.
Byproduct utilization in distillation industry; example; pumping slop from vats, and the piping; separation of liquid from grain; drying pressed material; packing dried grain; average results obtained; steam consumption and power requirements; specifications for the equipment; piping liquid slop; nature of dryer steam load; photos of equipment.

Variations in Air Conditioning Bids.
Vol. 7. No. 9. September, 1935. *p.* 443.
(Abstract of paper presented by J. J. Nance); examples; several reasons air conditioning bids vary.

What About Standards for Air Conditioning?
Vol. 7. No. 6. June, 1935. *p.* 290.
Comments of Samuel R. Lewis, Otto W. Armspach, M. G. Harbula, Wm. V. Hoier, and H. M. Hart on standards for "certified" air conditioning for comfort.

What Air Conditioning Did for My Business.
Vol. 7. No. 1. January, 1935. *p.* 23.
D. L. Toffenetti, head of Triangle Restaurants (Chicago) explains importance of air conditioning to restaurants; advantages of air conditioning candy stores and dress shops; illustration of air conditioned restaurant at Chicago World's Fair.

What Air Conditioning Did for My Business.
Vol. 7. No. 7. July, 1935. *p.* 338.
Advantages of air conditioning a book shop in Kansas City, Mo.

What We Think of Air Conditioning—an interview with Holmes Onderdonk.
Vol. 7. No. 10. October, 1935. *p.* 484.
Reasons for air conditioning Tribune Tower, Chicago, Ill.; 624 ton steam jet plant and 400 individual units; refrigeration costs for June, July and August 1933, 1934 and 1935; advantages; how air conditioning is advertised.

Why Air Conditioning Bids Vary—the Items in Comfort Cooling Design, by Louis A. Harding.
Vol. 7. No. 7. July, 1935. *p.* 317.
Why bids vary; what are the basic data? sensible heat load; entering air temperature; air outlet temperature for heating; weight of moisture to be removed; tons of refrigeration; dehumidifying washer with bypass; selection of evaporator cooling surface; example of selection; psychrometric chart, formulas, and total heat—entropy diagram for "Freon." (See also selection chart for coils, August, 1935, issue, p. 387, and p. 87, back section.)

World's Highest Air Conditioning System, by A. B. Wason.
Vol. 7. No. 6. June, 1935. *p.* 277.
Air conditioning system for American Cyanamid Co. offices, 57th to 61st floors, R. C. A. building, Rockefeller Center, New York City; zoning; reasons for using centrifugal water vapor refrigeration; cooling condensing water; the central station air conditioning plant; booster fan room layout; distribution of air; refrigerating plant; vibrationless base for compressor; temperature and humidity control; operating costs and operating data; advantage of air conditioning an office; diagram of booster fan arrangement; photos of building, refrigeration machine, and ducts.

Heating

Blast Heating System for a Swimming Pool, by C.C. Hermann.
Vol. 7. No. 2. February, 1935. *p.* 102.
Brief description and diagram of blast heating system for a Y. M. C. A. swimming pool room.

Check Plant and Building Heating Now, by T. Napier Adlam.
Vol. 7. No. 4. April, 1935. *p.* 177.
Four fundamental subdivisions which need consideration; waste in boiler plant; fuel; draft; oil burner; air leaks in flues; boiler water; boiler heating surface; the piping; traps; testing thermostatic elements, renewing old traps.

Check Plant and Building Heating, by T. Napier Adlam.
Vol. 7. No. 6. June, 1935. *p.* 285.
Vacuum pump; boiler return traps; domestic hot water savings; blended water; control; method of returning condensate to boiler from water heater coil through alternating receiver; arrangement for supplying hot water at different temperatures for different uses.

Club Cuts Fuel Cost One-Third, by R. J. Purcell.
Vol. 7. No. 10. October, 1935. *p.* 473.
New York club modernizes by installing forced draft equipment for three boilers; savings achieved.

Construct and Equip the Building for Economy in Heating and Air Conditioning, by Samuel R. Lewis.
Vol. 7. No. 2. February, 1935. *p.* 93.
(No. 3 of a series on building construction); effect of the sun on heating and cooling buildings; allowing for heat from sun in control of building heating systems; reducing heat gain of buildings; infiltration a factor dependent upon building construction.

Cost of Heating Cut by Putting the Heat Where It's Needed.
Vol. 7. No. 3. March, 1935. *p.* 145.
Importance of putting heat where it is needed; equipment for so doing; unit heaters installed to warm up printing presses save fuel by reducing time required to heat up the building; amount of fuel saved; photograph of installation; zoning heating system in office building to furnish heat to first three floors only.

Dam Builders Live in Electrically Heated City.
Vol. 7. No. 3. March, 1935. *p.* 140.
Mason City, Wash., houses workers on Grand Coulee dam project; reasons for heating buildings electrically; extent of electric heating system; cooling bunkhouses for workers on Colorado River Aqueduct project.

Diaphragm Valve Is Dropped for Better Heating Control, by H. G. Schaefer.
Vol. 7. No. 5. May, 1935. *p.* 244.
Better regulation of steam pressure accomplished by lowering diaphragm valve to increase static head, compensating for increase by adjusting counter-weight; why greater sensitivity was obtained.

Dividends from the Plant Heating System.
Vol. 7. No. 2. February, 1935. *p.* 101.
Brief summary of possibilities of reducing heating costs in plants and buildings; curve showing consumption of steam for heating a building with and without control.

Equalizing Hot Water Heating System, by Erwin L. Weber.
Vol. 7. No. 5. May, 1935. *p.* 238.
Importance of balancing hot water heating systems; electro-differential-thermometer developed to facilitate balancing; instrument described; equalizing system in a macaroni factory; economic value of equalization; use of same principle in balancing brine systems and locating leaky radiator traps; photo of instrument in use.

Flue Gas Analysis for Hotel Heating Plant.
Vol. 7. No. 9. September, 1935. *p.* 428.
(Answer to reader's question by Samuel R. Lewis); meaning of Orsat flue gas analysis; correcting conditions indicated.

Handling Fuel Oil from Tank Car to Burners, by Kalman Steiner.
Vol. 7. No. 11. November, 1935. *p.* 538.
Types of fuel oil pumps; speed-viscosity table, showing relation between viscosity, pump speed, type, and size; importance of tight suction line.

Handling Fuel Oil, by Kalman Steiner.
Vol. 7. No. 12. December, 1935. *p.* 575.
Stream-line and turbulent flow; determining pressure drop in piping; chart for determining friction factor; chart showing velocity plotted against pipe size; table for conversion of Saybolt seconds to centipoises and API gravity to specific gravity; formulas.

Heating and Ventilation Methods of Early American Builders Show Skill and Ingenuity, by Carleton W. Campbell.
Vol. 7. No. 9. September, 1935. *p.* 436.
Heating and ventilation methods used by aboriginal Americans; ruins at Mesa Verde National Park and Aztec Ruin National Monument investigated; view of Cliff Palace; view and cross-section of *kivas*, or ceremonial rooms, showing heating and ventilation arrangement.

Heating the Hillside Housing Project, by H. G. Schaefer and Lewis Smith.
Vol. 7. No. 12. December, 1935. *p.* 583.
Description of project; low pressure boiler plant for each block; boilers oil-fired; boiler control; header arrangement; zoning considered; method adopted provides for continuous circulation of sub-atmospheric steam; temperature control system; radiation and heat risers.

H. P. & A. C. Inspection Trips—Installing Heating System, by Francis A. Westbrook.
Vol. 7. No. 7. July, 1935. *p.* 330.
Four views of welded piping and radiator connections at Mellon Institute for Industrial Research, Pittsburgh, Pa.

How Improve Heating? by Samuel R. Lewis.
Vol. 7. No. 1. January, 1935. *p.* 17.
(Answer to hotel operating engineer); can heating of hotel be improved by changing from high to low pressure?; what are the savings?; what changes in system are necessary?;

discussion; recommendations; possibilities of saving by installing stokers, temperature control.

How to Reduce Next Winter's Heating Costs, by J. Earl Seiter.
Vol. 7. No. 8. August, 1935. *p.* 378.
Principles of heat conservation; day and night temperatures; temperature control; types of control; what can be accomplished; form for keeping record of heating; importance of instruments; general rules for economical heating.

Insulation Blown in Hollow Mullions and Spandrels of New Post Office Building, by D. W. Burnett.
Vol. 7. No. 7. July, 1935. *p.* 325.
Pneumatic installation of rock wool insulation in post office and custom house at St. Paul, Minn.; estimated fuel saving due to insulation; plan and section of spandrel; plan of steel mullion; plan of window; photos of building and insulation blowing equipment.

Kinks.
Vol. 7. No. 3. March, 1935. *p.* 130.
Removing old boiler from basement without cutting building wall; heating lubricant to flow in piping.

Methods of Using Waste Heat from Diesels, by Perry West.
Vol. 7. No. 2. February, 1935. *p.* 97.
Applications of diesel engines; available waste heat; savings effected by utilizing waste heat; waste gas heaters and boilers; formulas for heat transfer; heat balance; curves for hot water requirements and the coincident usable waste heat in jacket water and exhaust gases from diesel engine driven electric generators in an office building, a hotel, and an apartment.

One of 1934's Biggest Jobs—Rebuilding Chicago Stock Yards, by Walter A. Becker.
Vol. 7. No. 4. April, 1935. *p.* 189.
Central steam plant; underground pipe tunnels; heating 7200 seat amphitheater; ventilation; fan rooms; ducts; supply openings; exhaust ventilation provided by propeller fans; unit heaters in exhibition buildings; steam and return mains; expansion; damage to radiation and piping by fire; cooling Exchange building restaurant; unit heaters in industrial type buildings; pipe insulation and underground piping.

Operating Hotel Boiler Plant.
Vol. 7. No. 2. February, 1935. *p.* 79 (*back section*).
(Answer by Samuel R. Lewis to reader's question; stack temperature; when is boiler operated most efficiently, with overload or underload?; control of stoker and forced draft fan.

Operating Time and Trouble Saved (Stoker Installation), by Sabin Crocker.
Vol. 7. No. 7. July, 1935. *p.* 331.
Advantages of stoker firing and attention to coal and ash handling; methods of stoker installation; stoker and boiler base at floor level; stoker in pit, boiler base at floor level; stoker at floor level, boiler base elevated; photos of typical installations.

Persistent Conservation Efforts Cut Steam for Heating in Half, by Lyman R. Flook.
Vol. 7. No. 11. November, 1935. *p.* 513.
Central heating system at University of Chicago; metering the steam; steam conservation program and results accomplished; ten year tabulation of steam consumption; reducing peak steam load; loss in transmission of steam; steam use report forms and bills for steam; curve showing reduction in steam consumption, 1925-1935; load duration curves; photos of several of the buildings served.

Practical Heating, by Harold J. Taylor.
Vol. 7. No. 7. July, 1935. *p.* 338.
Installing radiators below water line of steam boiler; instructions for installing; figuring radiator size; typical jobs.

Practical Heating, by Harold J. Taylor.
Vol. 7. No. 8. August, 1935. *p.* 372.
Enlarging old boilers for added capacity; replacing old boilers; what to check.

Practical Heating, by Harold J. Taylor.
Vol. 7. No. 9. September, 1935. *p.* 440.
Heating service water with cast iron boiler; selection of capacity; boiler ratings.

Practical Heating, by Harold J. Taylor.
Vol. 7. No. 10. October, 1935. *p.* 486.
Installation of check vales on radiators; dimensions for blow-off tanks for high pressure boilers.

Practical Heating, by Harold J. Taylor.
Vol. 7. No. 11. November, 1935. *p.* 535.
Installing indirect hot water heaters; tapping the boiler; control; tank size; use of pump; heater size; vent valve; stoker fired jobs; boiler capacity; hot water systems; diagram of installation.

Revamping a Twenty-Year-Old Heating System, by George T. Condron.
Vol. 7. No. 3. March, 1935. *p.* 129.
Revamping heating system of St. Paul's Episcopal church, Springfield, Ill.; the old system; objectives of the remodeling work; the new system; stoker installed; advantage of control valve; results with new system; plan of buildings heated; diagram of unsatisfactory type of lift fitting.

School Heating Costs, Other Data, Presented in Graphical Form.
Vol. 7. No. 4. April, 1935. *p.* 199.
Review of study of 24 Iowa school buildings by Prof. R. A. Norman; curves for tons of coal per season and sq ft direct radiation, tons of coal per season and combined equivalent and direct radiation, tons of coal per season and enrollment capacity, tons of coal per season and cubic contents of building, time of fireman per month and cubical contents, power consumption and cubical contents, capacity enrollment and actual total enrollment to cubical contents, direct radiation and combined equivalent and direct radiation, combined direct and equivalent direct radiation and ventilating air, and combined direct and equivalent direct radiation and enrollment capacity; results of study and recommendations.

Simple Changes in Heating Systems and Better Operation Reduce Steam Costs, by George H. Tuttle.
Vol. 7, No. 12. December, 1935. *p.* 570.
Examples of improved operation and minor revisions which have achieved lower heating costs; separate steam line for heating restaurant in office building; separate line to supply steam to water storage tank; effect of study of operating conditions and automatic temperature control; weatherstripping and piping changes; loss due to waste of domestic hot water; tables of monthly steam consumption before and after changes, and per cent savings.

Suggestions for Modernizing Plant Heating.
Vol. 7. No. 1. January, 1935. *p.* 24.
(Comments by Homer R. Linn, C. W. Kimball, and A. W. Moulder); need for an engineer's survey; proper design important; adaptability of unit heaters to plants.

To Keep a Temperature at Any Point, Put the Control Where the Temperature's Wanted, by Samuel R. Lewis.
Vol. 7. No. 6. June, 1935. *p.* 289.
(Answer to reader's question); oil fired boiler in apartment building; indirect water heater; in mild weather, circulation from boiler through water heater stops; cause of trouble; proper location of temperature control.

Trouble Shooting, by William Goodman.
Vol. 7. No. 11. November, 1935. *p.* 528.
Steam heating boiler in theater lost water under certain operating conditions; description of system; analysis of cause; test of system; cause of trouble explained.

Types of Unit Heaters for Industrial Use, by Perry West.
Vol. 7. No. 10. October, 1935. *p.* 487.
Four general types of unit heaters briefly described; method of installation and applications of different types.

Unit Heaters for Industrial Use, by Perry West.
Vol. 7. No. 9. September, 1935. *p.* 419.
Estimating heating load, temperature gradient, infiltration, roof losses, fume and smoke removal, inside temperatures; selection and location of heaters; three methods of placing units sketched; temperature control; supply and return connections; good arrangement of return connection; low pressure system with open returns.

Use of Superheated Steam in Radiators, by A. P. Kratz.
Vol. 7. No. 6. June, 1935. *p.* 281.
(Answer to reader's question); effect on steam consumption of using superheated steam in radiators and heat exchangers.

Piping

Alteration of Pumping Equipment.
No. 7. No. 11. November, 1935. *p.* 517.
Alteration of equipment by means of oxy-acetylene welding and cutting.

Cement Piped at Boulder Dam.
Vol. 7. No. 3. March, 1935. *p.* 146.
Welded piping at Boulder dam used for conveying dry cement from blending plant; construction and layout of the piping; flanged joints facilitate removal of obstructions; air inlets and valve control.

Cold Storage Room Piping Fabricated by Bronze Welding, by T. F. Hooker.
No. 7. No. 4. April, 1935. *p.* 198.
Replacing calcium chloride brine coils in cold storage room; galvanized pipe bronze welded; tests made; test specimens; results; method of welding; advantages; view of test specimens and control end of cooling coil.

Compact Piping Layout for Boiler Feed Pumps, by G. W. Hauck.
Vol. 7, No. 12. December, 1935. *p.* 586.
Photograph and detail of compact piping layout for two steam turbine driven boiler feed pumps for three boilers; valves located for efficient operation.

Creep of Materials at High Temperatures.
Vol. 7. No. 7. July, 1935. *p.* 322.
Application of materials at high temperatures and information on creep abstracted from paper by W. P. Manning.

Design and Erection of a Bulk Fuel Oil Storage Plant, by Kalman Steiner.
Vol. 7. No. 5. May, 1935. *p.* 241.
Piping and heating major problems; factors influencing selection of site; determination of storage capacity; tank size and construction; plant layout; tank design; formula for metal thickness; pumps and piping; plan of piping and tanks; detail of tank structure; photos of piping, tanks, valve header, and pumps.

Design and Erection of a Bulk Fuel Oil Storage Plant, by Kalman Steiner.
Vol. 7. No. 6. June, 1935. *p.* 282.
Selection of pumping equipment; determining pipe sizes; formulas; heating storage tanks; computing heat transfer; formula for mean logarithmic temperature difference; construction of heating coils and detail of coils; steam and condensate piping; photo of track siding.

Design and Erection of a Bulk Fuel Oil Storage Plant, by Kalman Steiner.
Vol. 7. No. 7. July, 1935. *p.* 323.
Estimating required boiler capacity for heating oil; sizing steam and return piping; heating plant offices; welding piping; the question of future generation of electric power for pumping.

Design of Modern Industrial Piping Systems—the Flow of Fluids, by F. L. Snyder.
Vol. 7. No. 1. January, 1935. *p.* 5.
Investigation, checked by laboratory experiments and operating experience, leads to savings in economical design of industrial piping; discussion of flow of fluids in pipe; Fanning formula; Reynolds number; friction factor and condition of pipe; radius of bend; charts for pressure drop in pipes for various Reynolds numbers for liquids and gases; chart for converting bends into equivalent straight pipe; chart for

friction factor in pipe coils; viscosity conversion chart; explanation and examples of use of charts.

Design of Modern Industrial Piping Systems—Flexibility of Piping, by F. L. Snyder.
Vol. 7. No. 4. April, 1935. *p.* 181.
Inherent flexibility of pipe structures; use of welding fittings for expansion bends; deflection tests; deflection formulas; design data and examples of use; nominal diameter, outside diameter, wall thickness; moment of inertia $(1.5\ D)^{1.60}$ (D is nominal diameter), flexibility multiplication factor, and distance from farthest fiber to neutral axis of pipe for standard steel, extra heavy lap-welded and seamless steel, 250 lb. lap-welded 750 F working temperature, 300 lb seamless steel 750 F working temperature, 400 lb std. lap-welded 750 F working temperature, and 400, 600, 900 and 1500 std. seamless steel 750 F working temperature pipe; modulus of elasticity, allowable fiber stress, and thermal expansion of pipes (Also see July, 1935, issue, p. 324.)

Design of Modern Industrial Piping Systems—New Economies Through Modern Piping Construction, by F. L. Snyder.
Vol. 7. No. 8. August, 1935. *p.* 365.
Thin wall piping standard advocated; advantages; pressure piping code requirements for thickness of pipe; percentage of metal removed from pipe wall by threading; present standard and proposed wall thickness; American and German standard wall thicknesses; examples indicate economies through thinner wall thicknesses; photos of steam lines designed with lighter wall thicknesses; use of alloys.

Don't Jump at Conclusions When Looking for Trap Trouble, by T. H. Rea.
Vol. 7. No. 5. May, 1935. *p.* 240.
Example of typical example where trap draining steam heated drying rolls of a dry milk machine was incorrectly blamed for trouble; leak in syphon pipe the real cause.

Draining Steam-Using Equipment, by T. H. Rea.
Vol. 7. No. 10. October, 1935. *p.* 485.
Steam trap installation and maintenance for steam-using equipment; inspecting and overhauling traps; diagrams of methods of installation.

Flow of Water in Piping Studied with Movie Camera; Results Described Here, by Edgar E. Ambrosius and John C. Reed.
Vol. 7, No. 12. December, 1935. *p.* 578.
Method of studying flow of water in piping by means of movie camera; test set-up; results of study; distribution of velocity and velocity fluctuation across pipe diameter; sudden stoppage of flow; scrubbing action of fluid on pipe wall; flow through orifice; photos of stream-line and turbulent flow, and flow through orifice.

For Better Plant Operation—Meter Your Piping Services, by F. W. Rabe and Hugo Reichenbach.
Vol. 7. No. 2. February, 1935. *p.* 89.
Metering ammonia to three departments of Anheuser-Busch brewery; reasons, method; practical points considered in installing meters; diagrammatic steam flow meter board.

High Pressure—High Temperature Steam Piping Welding, by Sabin Crocker.
Vol. 7. No. 3. March, 1935. p. 132.
Piping at the Connors Creek plant of The Detroit Edison Company for 600 lb, 850 F; stress relieving welds; electric induction device for stress relieving described and illustrated; current consumption; control; purpose of stress relieving; design of flow nozzle for welding in line without distortion; details of small joints; welded sleeve coupling; small valves; socket fittings; attachment of small pipes to large pipes or castings by welding; conclusions.

How to Use Reynolds Numbers in Piping Calculations, by Max W. Benjamin.
Vol. 7. No. 11. November, 1935. *p.* 519.
Importance of accurate estimation of friction loss in power and industrial process piping; formula for pressure loss; Reynolds "functions"; Reynolds number dimensionless; converting Reynolds "functions" to Reynolds number, with table of factors; identifying Reynolds "functions," with tables; identifying proper friction loss formula; recent articles on subject compared; using the rational method of calculation; table of friction loss formulas.

Installing Piping in Cramped Quarters, by G. W. Hauck.
Vol. 7. No. 4. April. 1935. *p.* 194.
Fabricated piping with flanged and welded joints for exhaust header for new engine described; details of design.

Lead Piping for Process Liquids.
Vol. 7. No. 8. August. 1935. *p.* 373.
Chemicals handled by lead piping; temperature limits; "burning" or welding lead; wiped joints; photos of lead acid lines in pulp and paper plant, burned joints, and final wiping of joint.

Metallic Pipe Insulation.
Vol. 7. No. 11. November, 1935. *p.* 527.
Brief description of tests on metallic insulation as pipe covering; heat transfer coefficient.

Method of Steam Jacketing Pipe for Handling Heavy Oil, Tar, by G. W. Hauck.
Vol. 7. No. 11. November, 1935. *p.* 527.
Description of construction of 2½ in. piping for heavy road oil and tar steam-jacketed by means of 4 in. line; detail of end joints; cross-over connections.

New Process Piping Layout Speeds Paint Production Schedule, by S. I. Rottmayer.
Vol. 7. No. 5. May, 1935. *p.* 229.
Expansion of paint and varnish plant's activities called for replanning production program; two systems of storage tanks; the piping; supporting the piping; terminus of 26 piping systems at platform scale; threaded joints; schematic diagram of piping; photos of pumps; piping, and tanks.

New Sewage Treatment Plant Involves Big Piping Job, by A. F. Bowers.
Vol. 7. No. 9. September, 1935. p. 438.
New addition to Milwaukee, Wis., sewage treatment plant on Jones Island; the treating process; piping an important part of plant; amount of piping installed; metering the air; four views of the plant and piping.

"On the Job" in Piping Maintenance, by W. H. Wilson.
Vol. 7. No. 9. September, 1935. *p.* 441.
How alert maintenance of industrial piping saves time and trouble; examples; location of steam traps for proper maintenance attention.

Pipe Insulation Pays.
Vol. 7. No. 2. February. 1935. *p.* 90.
Table of heat loss from pipe per sq ft of surface for different temperatures and various insulation thicknesses; amount of fuel insulation saves.

Pipe Welding—Practical Field Testing and Instruction of Welders, by D. O. Ferguson.
Vol. 7. No. 6. June, 1935. *p.* 272.
Preliminary remarks to welders; types of welds made and tested; preparation of test coupons; the tests, nick break, tensile, ductility or free bend, and reverse bend; requirements for satisfactory weld; welding instruction; photos of pipe beveling device, welding by backhand method, coupon cutting machine, and tensile testing machine.

Pipe Welding—Practical Field Testing and Instruction of Welders, by D. O. Ferguson.
Vol. 7. No. 7. July, 1935. *p.* 335.
Classification of welders; follow-up tests; reports to welding supervisors; features and summary of program for testing and training welders.

Piping Pointers, by B. C. Rinehart.
Vol. 7. No. 10. October, 1935. *p.* 479.
Isometric drawings aid in operation and maintenance of piping systems; examples; isometric of piping for locomotive boiler washing system.

Removing Moisture from Compressed Air, by A. W. Loomis.
Vol. 7. No. 9. September, 1935. *p* 442.
Harmful effects of water in compressed air; location of intake; aftercoolers and moisture separators; amount of water to be removed; view of compressor, aftercooler, and receiver.

Resistance of Valves and Fittings to Flow of Fluids.
Vol. 7. No. 11. November, 1935. *p.* 534.
Chart showing resistance of valves and fittings to flow of fluids; example of use; tests upon which chart is based described briefly; pressure drop through globe valves in steam and water lines with pressure below and above disc.

Selecting Traps for Steam Piping, by T. H. Rea.
Vol. 7. No. 1. January, 1935. *p.* 19.
Traps on steam distribution mains must do two things—remove water of condensation without steam loss, and air or other incondensable gases; condensation due to warming up a cold line as well as from radiation loss must be considered; traps must be installed so that the condensation will get to them; steam condensed in warming up piping and by radiation losses; tables; spacing traps, selecting proper size, and getting condensate to the trap; diagram of steam header drainage trap installation.

Simplified Method for Solving Piping Problems, by Siegfried W. Spielvogel and Samuel Kameros.
Vol. 7. No. 9. September, 1935. *p.* 425.
Simplified method for checking an assumed piping layout for intensity of end reactions and determination of bending moments; procedure explained; examples.

Simplified Method for Solving Piping Problems, by Siegfried W. Spielvogel and Samuel Kameros.
Vol. 7. No. 10. October, 1935. *p.* 474.
(Part 2 of article; Part 1 published in September, 1935, issue, p. 425); examples of analysis of pipe bend with sloped branch, combination of straight and curved elements; centroid of circular arc; moments of inertia and products of inertia of 180 deg, 90, and 45 deg arcs.

"Somebody's Connected a Water Line to My Air Line," by John W. Hieronymus.
Vol. 7. No. 3. March, 1935. *p.* 144.
Why water is sometimes discharged with compressed air; amount of water which condenses; how the situation may be corrected; sketch of installation of air separator and air trap.

Specifications for Radiographic Examination of Steel Castings for Piping Service, by Herbert R. Isenburger.
Vol. 7. No. 11. November, 1935. *p.* 530.
Specifications which have proved practical in use.

Telemetering Aids Operation of District Steam Distribution System, by T. E. Purcell.
Vol. 7. No. 10. October. 1935. *p.* 465.
Telemetering system for Allegheny County Steam Heating Co., Pittsburgh, Pa.; theory of method; the system and its operation; operating conditions transmitted; the telemetering equipment; system operators office; map of distribution system showing metering circuits; photo of transmitter and recorder.

Use of Backing Rings in Pipe Welding.
Vol. 7. No. 4. April. 1935. *p.* 197.
Detailed data on backing rings used in the welding of 600 lb 850 F steam piping for Connors Creek plant described in February, 1935, issue by Sabin Crocker; instructions to field force for use of rings.

Vacuum Tube Sounds Warning If Freezing Threatens Piping, by Francis A. Westbrook.
Vol. 7. No. 6. June. 1935. *p.* 286.
Vacuum tube unit blows horn to avoid freezing of sprinkler system piping at Gotham Silk Hosiery Co., Dover, N. J.; photo of unit.

Welding High Pressure—High Temperature Steam Piping, by Sabin Crocker.
Vol. 7. No. 2. February, 1935. *p.* 81.
Rebuilding Connors Creek plant of Detroit Edison Co. for 600 lb. 850 F steam; objectives of welded design; welding methods and quality control; qualifying welders; graphical recording device for showing how consistently the welder lays on a bead; details of the larger piping—bevel, backing rings; laboratory studies on large welded joints. (Also see information on backing rings. April, 1935. issue. p. 197.)

Welding High Pressure Steam Piping at U. S. Industrial Alcohol Co. Plant, by J. A. Freiday.
Vol. 7. No. 12. December, 1935. *p.* 568.
Description of welding by oxy-acetylene process of power and process steam piping for plant reconstruction project; erecting 8,400 ft., 12¾ in. outdoor steam line; qualifying welders; testing the line; insulation; welding power plant piping; testing; number of welds made per day; stress relieving.

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